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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/583,081	06/15/2006	Tadashi Ino	Q95054	9129

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EXAMINER	
BOYLE, ROBERT C	

ART UNIT	PAPER NUMBER
1796	

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04/17/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/583,081	INO ET AL.	
	Examiner	Art Unit	
	ROBERT C. BOYLE	1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 April 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *4/02/2009*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Any rejections stated in the previous Office Action and not repeated below are withdrawn.

3. No new grounds of rejection are present. Therefore, the following action is properly made FINAL.

Claim Rejections - 35 USC § 103

4. Claims 1-5, 7-11, and 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Curtin et al., U.S. Patent 6,150,426 in view of Schreyer et al., U.S. Patent 3,085,083.

5. Claim 1 discloses a fluoropolymer containing $-CF_2H$ endgroups and acid/acid salt groups where the acid salt group can be SO_3M, where M is a metal in group 1 or 2 in the periodic table. Curtin teaches a fluoropolymer with a SO_3M group where M can be Na (column 3-4, lines 57-43). Curtin does not teach $-CF_2H$ endgroups.

6. Schreyer teaches the formation of fluoropolymers with $-CF_2H$ endgroups (column 2, lines 60-67). One of ordinary skill in the art at the time the invention was made would have been motivated to modify the fluoropolymer in Curtin with the endgroups taught in Schreyer because terminating the polymer in a $-CF_2H$ endgroup adds to the thermal stability and corrosion resistance of the polymer, see Schreyer, columns 1-2, lines 69-

24. Therefore, the invention as a whole would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made.

7. Claim 2 discloses the fluoropolymer having –CF2O2X at the chain terminals, which are heat treated to yield $-CF_2H$ endgroups. Schreyer teaches this limitation (column 2, lines 28-67).

8. Claim 3 discloses the acid salt group is a sulfonic acid group. Curtin teaches this limitation (column 3-4, lines 57-43).

9. Claim 4 discloses a method of producing the fluoropolymer of claim 1 where the fluoropolymer is subjected to heat treatment between 120°C to 400°C where the polymer has a SO_2Z group, where Z can be –OM and M can be a group 1 metal. Schreyer teaches heating the fluoropolymer above 200°C (column 3, lines 67-71). Curtin teaches a copolymer having units derived from a formula disclosed in claim 4 (column 3-4, lines 57-43).

10. Claim 5 discloses the heat treatment occurs between 120°C to 200°C in the presence of water. Schreyer teaches heating the polymer in the presence of water with temperatures between 200°C to 400°C (column 2, lines 14-21). The reference differs from claim 5 by failing to disclose an example falling within the claimed range, and by failing to disclose a range with sufficient specificity to anticipate the claimed range. However, the reference teaches a range that overlaps the claimed range, and it has been held that overlapping ranges are sufficient to establish *prima facie* obviousness. See MPEP 2144.05.

11. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected from the overlapping portion of the range taught by the reference because overlapping ranges have been held to establish *prima facie* obviousness.

12. Claim 7 discloses the fluoropolymer precursor is a copolymer. Curtin teaches this limitation (column 4, lines 36-43).

13. Claim 8 discloses structural details. Curtin teaches this limitation (column 3-4, lines 57-43).

14. Claim 9 discloses the fluoropolymer precursor is a powder, dispersion, solution or membrane molding. Schreyer teaches the precursor as a slurry in water (column 3, lines 67-71).

15. Claim 10 discloses the fluoropolymer precursor is a membrane molding. Curtin teaches that the polymer can be used in membranes (column 9, lines 30-33).

16. Claim 11 discloses an electrolyte membrane comprising the fluoropolymer of claim 1. Curtin teaches that the polymer can be used in membranes and in electrolytic cells (column 9, lines 27-33).

17. Claim 15 discloses a membrane electrode assembly. Curtin teaches that the polymer can be used in membranes and in electrolytic cells (column 9, lines 27-33).

18. Claim 16 discloses a fuel cell comprising the membrane electrode assembly of claim 15. Curtin teaches that the polymer can be used in fuel cells, membranes, and in electrolytic cells (column 9, lines 27-33).

19. Claim 17 discloses a fuel cell comprising the membrane electrode of claim 11. Curtin teaches that the polymer can be used in fuel cells, membranes and in electrolytic cells (column 9, lines 27-33).

20. Claims 1-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tatemoto et al., PCT Publication WO 2004/018527 in view of Schreyer et al., U.S. Patent 3,085,083. For the convenience of translation, references and citations will be made to the U.S. national stage document, U.S. Patent Application Publication No. 2005/0228127. The discussion with respect to Schreyer as set forth in paragraphs 4-19 above is incorporated here by reference.

21. Claim 1 discloses a fluoropolymer containing $-CF_2H$ endgroups and acid/acid salt groups where the acid salt group can be SO_3M, where M is a metal in group 1 or 2 in the periodic table. Tatemoto teaches a fluoropolymer with a SO_3M group where M can be a group 1 metal (abstract). Tatemoto does not teach $-CF_2H$ endgroups.

22. Schreyer teaches the formation of fluoropolymers with $-CF_2H$ endgroups (column 2, lines 60-67). One of ordinary skill in the art at the time the invention was made would have been motivated to modify the fluoropolymer in Tatemoto with the endgroups taught in Schreyer because terminating the polymer in a $-CF_2H$ endgroup adds to the thermal stability and corrosion resistance of the polymer, see Schreyer, columns 1-2, lines 69-24. Therefore, the invention as a whole would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made.

23. Claim 2 discloses the fluoropolymer having –CF2O2X at the chain terminals, which are heat treated to yield $–CF_2H$ endgroups. Schreyer teaches this limitation (column 2, lines 28-67).

24. Claim 3 discloses the acid salt group is a sulfonic acid group. Tatemoto teaches this limitation (paragraphs 0138-0139).

25. Claim 4 discloses a method of producing the fluoropolymer of claim 1 where the fluoropolymer is subjected to heat treatment between 120°C to 400°C where the polymer has a SO_2Z group, where Z can be –OM and M can be a group 1 metal. Schreyer teaches heating the fluoropolymer above 200°C (column 3, lines 67-71). Tatemoto teaches a fluoropolymer having units derived from a formula disclosed in claim 4 (paragraphs 0138-0139).

26. Claim 5 discloses the heat treatment occurs between 120°C to 200°C in the presence of water. Schreyer teaches heating the polymer in the presence of water with temperatures between 200°C to 400°C (column 2, lines 14-21). The reference differs from claim 5 by failing to disclose an example falling within the claimed range, and by failing to disclose a range with sufficient specificity to anticipate the claimed range. However, the reference teaches a range that overlaps the claimed range, and it has been held that overlapping ranges are sufficient to establish *prima facie* obviousness. See MPEP 2144.05.

27. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected from the overlapping portion of the range

taught by the reference because overlapping ranges have been held to establish *prima facie* obviousness.

28. Claim 6 discloses an organic solvent having compatibility with water and a boiling point between 100 and 300°C. Tatemoto teaches boiling water away from a fluoropolymer in the presence of methylpyrrolidone (paragraph 0181).

29. Claim 7 discloses the fluoropolymer precursor is a copolymer. Tatemoto teaches this limitation (paragraphs 0138-0139; 0146).

30. Claim 8 discloses structural details. Tatemoto teaches this limitation (paragraphs 0138-0139).

31. Claim 9 discloses the fluoropolymer precursor is a powder, dispersion, solution or membrane molding. Tatemoto teaches this limitation (paragraphs 0020-0021).

32. Claim 10 discloses the fluoropolymer precursor is a membrane molding. Tatemoto teaches fluoropolymers can be used in membrane molding (paragraphs 0002, 0007).

33. Claim 11 discloses an electrolyte membrane comprising the fluoropolymer of claim 1. Tatemoto teaches this limitation (paragraphs 0034-0035).

34. Claim 12 discloses an immobilized active substance material comprising the fluoropolymer of claim 1 and an active substance. Tatemoto teaches this limitation (paragraphs 0032-0033).

35. Claim 13 discloses the active substance is a catalyst and claim 14 discloses the catalyst is a platinum containing metal. Tatemoto teaches these limitations (paragraphs 0194-0196).

36. Claim 15 discloses a membrane electrode assembly. Tatemoto teaches this limitation (paragraphs 0002-0003; 052-0053).

37. Claim 16 discloses a fuel cell comprising the membrane electrode assembly of claim 15. Tatemoto teaches this limitation (paragraphs 0002-0003; 0036-0037).

38. Claim 17 discloses a fuel cell comprising the membrane electrode of claim 11. Tatemoto teaches this limitation (paragraphs 0002-0003; 0036-0037).

Response to Arguments

39. Applicant's arguments filed February 26, 2009 have been fully considered but they are not persuasive.

40. Applicant's argument that Schreyer only teaches thermal stability of copolymers having no acid/acid salt groups is not persuasive. While Schreyer does not give any examples of polymers with acid/acid salts, Schreyer states: "The process of the present invention is applicable to all types of fluorocarbon polymers" (column 4, lines 15-18). This includes polymers with acid/acid salts. Both Curtin and Tatemoto teach fluoropolymers, therefore the process of Schreyer could be used with Curtin and Tatemoto.

41. Futhermore, while Schreyer does not disclose all the features of the present claimed invention, Schreyer is used as a teaching reference, and therefore, it is not necessary for this secondary reference to contain all the features of the presently claimed invention, MPEP 2145; *In re Nievelt*, 482 F.2d 965, 179 USPQ 224, 226 (CCPA 1973); *In re Keller* 624 F.2d 413, 208 USPQ 871, 881 (CCPA 1981). Rather this

reference teaches a certain concept, and in combination with the primary reference, discloses the presently claimed invention. Therefore, Applicant's argument is not persuasive.

42. Applicant argues that the state of the art, as described in U.S. 2006/0063903 and U.S. 2006/0287497, is that $-CF_2H$ endgroups are not stable. Applicant's argument is not persuasive.

43. While it is noted that the references cited by the Applicant recite that $-CF_2H$ groups are unstable, these references contradict the statements of Schreyer regarding the stability of $-CF_2H$ endgroups which states that $-CF_2H$ endgroups are "highly stable."

44. Where the teachings of two or more prior art references conflict, the examiner must weigh the power of each reference to suggest solutions to one of ordinary skill in the art, considering the degree to which one reference might accurately discredit another. See MPEP 2143.01, *In re Young*, 927 F.2d 588, 18 USPQ2d 1089 (Fed. Cir. 1991).

45. It is noted that the references contradict over the stability of the groups, and stability is a relative concept, and depends on the frame of reference. The references cited do not state how the functional groups are unstable, for example: thermodynamically, in reaction with free radicals, susceptible to other reagents, etcetera.

46. The instant application compares stability by reacting Fenton's reagent with fluoropolymers with $-CF_2H$ groups versus carboxyl groups and states that the $-CF_2H$ groups are more stable (see instant application paragraphs 0110, 0119).

47. Schreyer teaches that, in the presence of peroxide, vinyl end-groups oxidize to carboxylate end groups, which can hydrolyze in water, and decompose to form vinyl groups when heated, which can undergo further reaction; therefore, the peroxide initiated decomposition can be halted with $-CF_2H$ groups (column 2, lines 24-72).

48. The references cited by the Applicant only give a list of several functional groups, with no mechanistic information on the stability or decomposition. The references do not recite which functional groups are more or less stable. U.S. 2006/0287497 states "such a polymer gradually decomposes during long-term operation" and "exposed to severe operation conditions" but does not give guidance on the length of "long term" or what "severe operation conditions" are (see U.S. 2006/0287497: paragraph 0018).

49. One of ordinary skill in the art would recognize that stability is a relative term, and a $-CF_2H$ group might be stable compared to a –COOH group but not an $-SO_2F$ group and that for different applications, different stabilities might be necessary. A high powered or long lasting electrolyte cell might need a more robust fluoropolymer due to extreme conditions or length of operation. However, electrolyte cells that are more cost effective, not needing extreme conditions or long operations might benefit from having an group that is more stable than a -COOH group, but not as costly to make as a $-SO_2F$ group.

50. Furthermore, U.S. 2006/0063903 states that conversion of –COOH to $-CF_2H$ has been proposed to stabilize the chain terminals (see U.S. 2006/0063903: paragraphs 0005-6) which would suggest that $-CF_2H$ might be useful as an endgroup.

51. In view of the above discussion, the references cited by the Applicant do not discredit Schreyer, but rather would lead one of ordinary skill in the art to consider the functionality on the endgroups more carefully. Therefore, Applicant's argument is not persuasive.

52. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, one of ordinary skill in the art at the time the invention was made would have been motivated to modify the fluoropolymer in Curtis or Tatemoto with the endgroups taught in Schreyer because terminating the polymer in a $-CF_2H$ endgroup adds to the thermal stability and corrosion resistance of the polymer (see Schreyer: columns 1-2, lines 69-24).

Conclusion

53. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ROBERT C. BOYLE whose telephone number is (571)270-7347. The examiner can normally be reached on Monday-Friday, 9:00AM-5:00PM Eastern.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on (571)272-1119. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/R. C. B./
Examiner, Art Unit 1796

/Vasu Jagannathan/
Supervisory Patent Examiner, Art Unit 1796